

Exhibit 2

```
#####
# Program: needle
# Rundate: Wed Aug 23 22:03:02 2006
# Align_format: srspair
# Report_file: /ebi/extserv/old-work/needle-20060823-22025746567743.output
#####
```

```
#=====
#
# Aligned_sequences: 2
# 1: SEQ_183
# 2: G_kaustophilus
# Matrix: EBLOSUM62
# Gap_penalty: 10.0
# Extend_penalty: 0.5
#
# Length: 4335
# Identity: 4284/4335 (98.8%)
# Similarity: 4284/4335 (98.8%)
# Gaps: 34/4335 ( 0.8%)
# Score: 25976.0
#
#
#=====
```

SEQ_183	1	ATGGTGACAAAAGAGCAAAA	20
G_kaustophilu	1	atgatgttgagaggggaacaaacggacgtcatggtgacaaaagagcaaaa	50
SEQ_183	21	AGAGCGGTTTCTCATCTGCTTGAGCAGCTGAAGATGACGTCGGACGAAT	70
G_kaustophilu	51	agagcgggtttctcatctgcttgagcagctgaagatgacgtcggacgaat	100
SEQ_183	71	GGATGCGCATTTTCGTGAGGCAGCCATTGCGAAAGTCGTGATCGATAAA	120
G_kaustophilu	101	ggatgccgcattttcgtgagggcagccattcgcaaagtcgtgatcgataaa	150
SEQ_183	121	GAGGAGAAAAGCTGGCATTTTTATTTTCAGTTTCGACAACGTGCTGCCGGT	170
G_kaustophilu	151	gaggagaaaagctggcatttttattttcagttcgacaacgtgctgccggt	200
SEQ_183	171	TCATGTATACAAAACGTTTGCCGATCGGCTGCAGACGGCGTTCCGCCATA	220
G_kaustophilu	201	tcatgtatacaaaaacgtttgccgatcggctgcagacggcggttccgccata	250
SEQ_183	221	TCGCCGCCGTCCGCCATACGATGGAGGTCGAAGCGCCGCCGTAAC TGAG	270
G_kaustophilu	251	tcgccgccgtccgccatac gatggaggtcgaagcgccgcgctaactgag	300
SEQ_183	271	GCGGATGTGCAGGCGTATTGGCCGCTTTGCCTTGCCGAGCTGCAAGAAGG	320
G_kaustophilu	301	gcggatgtgcaggcgtattggccgctttgccttgccgagctgcaagaagg	350
SEQ_183	321	CATGTCGCCGCTTGTCGATTGGCTCAGCCGGCAGACGCCTGAGCTGAAAAG	370
G_kaustophilu	351	catgtcgccgcttgctcgattggctcagccggcagacgcctgagctgaaag	400
SEQ_183	371	GAAACAAGCTGCTTGTCGTTGCCCGCCATGAAGCGGAAGCGCTGGCGATC	420
G_kaustophilu	401	gaaacaagctgcttgctggttgcccgccatgaagcggaagcgctggcgatc	450
SEQ_183	421	AAACGGCGGTTTCGCCAAAAAATCGCTGATGTGTACGCTTCGTTTGGCTT	470
G_kaustophilu	451	aaacggcggttcgccaaaaaaatcgctgatgtgtacgcttcggttggtt	500

SEQ_183	471	TCCCCCCCCTTCAGCTTGACGTCAGCGTCGAGCCGTCCAAGCAAGAAATGG	520
G_kaustophilu	501	cccccccttcagcttgacgtcagcgtcgagccgtccaagcaagaaatgg	550
SEQ_183	521	AACAGTTTTTTGGCGCAAAAACAGCAAGAGGACGAAGAGCGAGCGCTTGCT	570
G_kaustophilu	551	aacagtttttggcgcaaaaacagcaagaggacgaagagcgagcgcttgct	600
SEQ_183	571	GTACTGACCGATTATTAGCGAGGGAAGAAGAAAAGGCCGCGTCTGCGCCGCC	620
G_kaustophilu	601	gtactgaccgattttagcgagggaagaagaaaaggccgctctgcgccgcc	650
SEQ_183	621	GTCCGGTCCGCTTGTGTCATCGGCTATCCGATCCGCGACGAGGAGCCGGTGC	670
G_kaustophilu	651	gtccgggtccgcttgtcatcggtatccgatccgcgacgaggagccgggtgc	700
SEQ_183	671	GGCGGCTTGAAACGATCGTCGAAGAAGAGCGGCGCGTCTGTGCAAGGC	720
G_kaustophilu	701	ggcggcttgaaacgatcgtcgaagaagagcggcgcgctggtgtgcaaggc	750
SEQ_183	721	TATGTATTTGACGCCGAAGTGAGCGAATTAAAAAGCGGCCGACGCTGTT	770
G_kaustophilu	751	tatgtatttgacgccgaagtgagcgaattaaaaagcggccgcacgctgtt	800
SEQ_183	771	GACCATGAAAATCACAGATTACAGAACTCGATTTTAGTCAAAATGTTCT	820
G_kaustophilu	801	gaccatgaaaatcaccgattacacgaactcgatttttagtcaaaatgttct	850
SEQ_183	821	CGCGCGACAAAGAGGACGCCGAGCTTATGAGCGGCGTCAAAAAAGGCATG	870
G_kaustophilu	851	cgcgcgacaaagaggacgccgagctcatgagcggcgctcaaaaaaggcatg	900
SEQ_183	871	TGGGTGAAAGTGCGCGGCAGCGTGCAAAACGATACGTTTCGTCCGTGATTT	920
G_kaustophilu	901	tgggtgaaagtgcgcggcagcggtgcaaaacgatacgttcgtccgtgattt	950
SEQ_183	921	GGTCATCATCGCCAACGATTGAACGAAATCGCCGCAAACGAACGGCAAG	970
G_kaustophilu	951	ggtcatcatcgccaacgatttgaacgaaatcgccgcaaacgaacgggaag	1000
SEQ_183	971	ATACGGCGCCGGAAGGGGAAAAGAGGGTCGAGCTCCATTTGCATACCCCG	1020
G_kaustophilu	1001	atacggcgccggaaggggaaaaaagggtcgagctccatttgcataccccg	1050
SEQ_183	1021	ATGAGCCAAATGGACCGGGTCACCTCGGTGACAAAACCTCATTGAGCAAGC	1070
G_kaustophilu	1051	atgagccaaatggacgggtcacctcggtgacaaaactcattgagcaagc	1100
SEQ_183	1071	GAAAAAATGGGGGCATCCGGCGATCGCCGTCACCGACCATGCCGTTGTTC	1120
G_kaustophilu	1101	gaaaaaatgggggcatccggcgatcgccgtcaccgaccatgccgttggttc	1150
SEQ_183	1121	AGTCGTTTCCGGAGGCCTACAGCGCGGCGAAAAAACACGGCATGAAGGTC	1170
G_kaustophilu	1151	agtcgtttccggaggcctacagcgcgcgaaaaaacacggcatgaaggtc	1200
SEQ_183	1171	ATTTACGGCCTTGAGGCGAACATCGTTCGACGATGGCGTGCCGATCGCCTA	1220
G_kaustophilu	1201	atttacggccttgaggcgaacatcgtcgacgatggcggtgccgatcgcta	1250
SEQ_183	1221	CAATGAGACGCACCGCGCTCTTTCGGAGGAAACGTACGTCGTCCTTTGACG	1270
G_kaustophilu	1251	caatgaaacgcaccgcgctctttcggaggaaacgtacgtcgtctttgacg	1300

SEQ_183	1271	TCGAGACGACGGGCCTGTGCGCTGTGTACAATACGATCATTGAGCTGGCG	1320
G_kaustophilu	1301	tcgagacgacgggcctgtcggtgtgtacaatacgatcattgagctggcg	1350
SEQ_183	1321	GCGGTGAAAGTGAAAGACGGCGAGATCATCGACCGATTTCATGTCGTTTGC	1370
G_kaustophilu	1351	gcggtgaaagtgaagacggcgagatcatcgaccggttcattgtcgtttgc	1400
SEQ_183	1371	CAACCCTGGACATCCGTTGTGCGGTGACAACGATGGAGCTGACTGGGATCA	1420
G_kaustophilu	1401	caaccctggacatccgttgtcagtgacaacgatggagctgactgggatca	1450
SEQ_183	1421	CCGATGAGATGGTGAAAGACGCCCCGAAGCCGGACGAGGTGCTAGCCCCGT	1470
G_kaustophilu	1451	ccgatgagatggtgaaagacgccccgaagccggacgaggtgctagcccg	1500
SEQ_183	1471	TTTGTGACTGGGCCGGCGATGCGACGCTTGTGCCCCACAACGCCAGCTT	1520
G_kaustophilu	1501	tttgtgactgggcccggcgatgcgacgcttgttgcacacaacgccagctt	1550
SEQ_183	1521	TGACATCGGTTTAAAAACGCGGCCTCGCTCGCATGGGGCGCGCAAAA	1570
G_kaustophilu	1551	tgacatcggttttttaaacacgggcctcgctcgcatggggcgcgcaaaa	1600
SEQ_183	1571	TCGCGAATCCAGTCATCGATACGCTCGAGCTGGCCCGTTTATACCCG	1620
G_kaustophilu	1601	tcgcgatccagtcacgatacgctcgagctggcccggtttttatacccg	1650
SEQ_183	1621	GATTGAAAAAACCATCGGCTCAATACATTGTGCAAAAAATTGACATTGA	1670
G_kaustophilu	1651	gatttgaaaaaaccatcggtcaatacattgtgcaaaaaatttgacattga	1700
SEQ_183	1671	ATTGACGCAGCATCACCGGCCATCTACGACGCGGAGGCGACCGGGCATT	1720
G_kaustophilu	1701	attgacgcagcatcaccgcgccatctacgacgaggcgaccgggcatt	1750
SEQ_183	1721	TGCTTATGCGGCTGTTGAAGGAAGCGGAAGAGCGCGGCATACTGTTTCAT	1770
G_kaustophilu	1751	tgcttatgcggtgttgaaggaagcggaagagcgcggcatactgtttcat	1800
SEQ_183	1771	GACGAATTAACAGCCGCACGCACAGCGAAGCGTCCTATCGGCTTGCGCG	1820
G_kaustophilu	1801	gacgaattaaacagccgcacgcacagcgaagcgctcctatcggttgcgcg	1850
SEQ_183	1821	CCCGTTCCATGTGACGCTGTTGGCGCAAAACGAGACTGGATTGAAAAATT	1870
G_kaustophilu	1851	cccgttccatgtgacgctgttggcgcaaaacgagactggattgaaaaatt	1900
SEQ_183	1871	TGTTCAAGCTTGTGTCAATTGTGCGACATTCAATATTTTACCGTGTGCCG	1920
G_kaustophilu	1901	tgttcaagcttgtgtcattgtcgacacattcaatattttcacccgtgtgccg	1950
SEQ_183	1921	CGCATCCCGCGCTCCGTGCTCGTCAAGCACCGCGACGGCCTGCTTGTCGG	1970
G_kaustophilu	1951	cgcatacccgcgctccgtgctcgtaagcaccgcgacggcctgcttgcgg	2000
SEQ_183	1971	CTCGGGCTGCGACAAAGGAGAGCTGTTTGACAACCTTGATCCAAAAGGCGC	2020
G_kaustophilu	2001	ctcgggctgcgacaaaggagagctgtttgacaacttgatccaaaaggcgc	2050
SEQ_183	2021	CGGAAGAAGTCGAAGACATCGCCCCGTTTTTACGATTTTCTGAAGTGCAT	2070
G_kaustophilu	2051	cggaagaagtgaagacatcgcccggtttttacgattttctgaagtgc	2100

SEQ_183	2071	CCGCCGGACGTGTACAAGCCGCTCATCGAGATGGATTATGTGAAAAGACGA	2120
G_kaustophilu	2101	 ccgccggacgtgtacaagccgctcatcgagatggattatgtgaaagacga	2150
SEQ_183	2121	AGAGATGATCAAAAACATCATCCGCAGCATCGTCGCCCTTGGTGAGAAGC	2170
G_kaustophilu	2151	 agagatgatcaaaaacatcatccgcagcatcgtcgcccttggtgagaagc	2200
SEQ_183	2171	TTGACATCCCGGTTGTGCGCCACTGGCAACGTCCATTACTTGAACCCAGAA	2220
G_kaustophilu	2201	 ttgacatcccggttgtcgccaactggcaacgtccattacttgaacccagaa	2250
SEQ_183	2221	GATAAAATTTACCGGAAAATCTTAATCCATTTCGCAAGGCGGGCGAATCC	2270
G_kaustophilu	2251	 gataaaatttacccgaaaatcttaatccatttcgcaaggcggggcgaatcc	2300
SEQ_183	2271	GCTCAACCGCCATGAACTGCCGGATGTATATTTCCGTACGACGAATGAAA	2320
G_kaustophilu	2301	 gctcaaccgccatgaactgccggatgtatatttccgtaacgacgaatgaaa	2350
SEQ_183	2321	TGCTTGACTGCTTCTCGTTTMTAGGGCCGGAAAAAGCGAAGGAAATCGTC	2370
G_kaustophilu	2351	 tgcttgactgcttctcgtttttagggccggaaaaagcgaaggaaatcgtc	2400
SEQ_183	2371	GTTGACAACACGCAAAAAATCGCTTCGTTAATCGGCGATGTCAAGCCGAT	2420
G_kaustophilu	2401	 gttgacaacacgcaaaaaatcgcttcgttaatcggcgatgtcaagccgat	2450
SEQ_183	2421	CAAAGATGAGCTGTATACGCCCGCGCATTGAAGGGGCGGACGAGGAAATCA	2470
G_kaustophilu	2451	 caaagatgagctgtatacgcccgcgcatgaagggcgacgaggaaatca	2500
SEQ_183	2471	GGGAAATGAGCTACCGGCGGGCGAAGGAAATTTACGGCGACCCGTTGCCG	2520
G_kaustophilu	2501	 gggaaatgagctaccggcgggcggaaggaaatttacggcgacccggtgccg	2550
SEQ_183	2521	AAACTTGTTGAAGAGCGGCTTGAGAAGGAGCTAAAAAGCATCATCGGCCA	2570
G_kaustophilu	2551	 aaacttgttgaagagcggcttgagaaggagctaaaaagcatcatcggcca	2600
SEQ_183	2571	TGGCTTTGCCGTCATTTATTTGATCTCGCACAAGCTTGTGAAAAAATCGC	2620
G_kaustophilu	2601	 tggctttgccgtcatttatattgatctcgcacaaagcttgtaaaaaatcgc	2650
SEQ_183	2621	TCGATGACGGCTACCTTGTCGGGTCGCGCGGATCGGTCGGCTCGTCGTTT	2670
G_kaustophilu	2651	 tcgatgacggctaccttgtcgggtcgcgcggatcggtcggctcgtcgttt	2700
SEQ_183	2671	GTCGCGACGATGACGGAAATCACCGAGGTCAATCCGCTGCCGCCGCATTA	2720
G_kaustophilu	2701	 gtcgcgacgatgacggaaatcacccgaggtcaatccgctgccgccgcatta	2750
SEQ_183	2721	CGTTTGCCCGAACTGCAAGCATTCGGAGTTCTTTAACGACGGTTCAGTCG	2770
G_kaustophilu	2751	 cgtttgcccaaactgcaagcattcggagttctttaacgacggttcagtcg	2800
SEQ_183	2771	GCTCAGGGTTTGATTTGCCGGATAAAAACTGCCCGCGATGTGGGACGAAA	2820
G_kaustophilu	2801	 gctcagggtttgatttgccggataaaaaactgcccgcatgtggaacgaaa	2850
SEQ_183	2821	TACAAGAAAGACGGGCAAGACATCCCGTTTGAGACGTTTCTCGGCTTTAA	2870
G_kaustophilu	2851	 tacaagaaagacgggcaagacatcccgtttgagacgtttctcggttttaa	2900

SEQ_183	2871	AGGCGACAAAGTGCCGGATATCGACTTGAACCTTTTCCGGCGAATACCAGC	2920
G_kaustophilu	2901	 aggcgacaaagtgccggatatcgacttgaacttttcggcggaataccagc	2950
SEQ_183	2921	CGCGCGCCACAACTATACGAAAGTGCTGTTTGGCGAAGACAAACGCTCTAC	2970
G_kaustophilu	2951	 cgcgcgcccaactatacgaaagtgcgtgttggcgaagacaacgtctac	3000
SEQ_183	2971	CGCGCCGGGACGATTGGCACGGTCGCTGACAAAACGGCGTACGGATTTGT	3020
G_kaustophilu	3001	 cgcgccgggacgattggcacggtcgctgacaaaacggcgtaaggatttgt	3050
SEQ_183	3021	CAAAGCGTATGCGAGCGACCATAACTTAGAGCTGCGCGCGCGGAAATCG	3070
G_kaustophilu	3051	 caaagcgtatgcgagcgaccataacttagagctgcgcgcgcggaatcg	3100
SEQ_183	3071	A-CGGCTCGCGGCTGGCTGCACCGGGTGAAGCGGACGACCGGGCAGCAT	3119
G_kaustophilu	3101	 acggctcgcggtggctgcacggggtgaagcggaacgacggacagcat	3150
SEQ_183	3120	CCGGGCGGCATCATCGTCGTCCCGGATTATATGGAATTTACGATTTTAC	3169
G_kaustophilu	3151	 ccgggcggcacatcatcgctcgctccctgattatatggaaatttacgattttac	3200
SEQ_183	3170	GCCGATTCAATATCCGGCCGATGACACGTCCTCTGAATGGCGGACGACCC	3219
G_kaustophilu	3201	 gccgattcaatatccggccgatgacacgtcctctgaatggcggaacgaccc	3250
SEQ_183	3220	ATTTGACTTCCATTTCGATCCACGACAATTTGTTGAAGCTCGATATTCTC	3269
G_kaustophilu	3251	 atttcgacttccattcgatccacgacaatttgttgaagctcgatattctc	3300
SEQ_183	3270	GGGCACGACGATCCGACGGTCATTTCGCATGCTGCAAGATTTAAGCGGCAT	3319
G_kaustophilu	3301	 gggcacgacgatccgacggtcatttcgcattgctgcaagatttaagggcat	3350
SEQ_183	3320	CGATCCGAAAACGATCCCGACCGACGACCCGGATGTGATGGGCATTTTCA	3369
G_kaustophilu	3351	 cgatccgaaaacgatcccgaccgacgacccggatgtgatgggcattttca	3400
SEQ_183	3370	GCAGCACCGAGCCGCTTGGCGTTACGCCGAGCAAATCATGTGCAATGTC	3419
G_kaustophilu	3401	 gcagcaccgagccgcttggcgttacgcggagcaaatacatgtgcaatgtc	3450
SEQ_183	3420	GGCACGATCGGCATTCCGGAGTTTGGCACGCGCTTCGTTCCGCCAAATGTT	3469
G_kaustophilu	3451	 ggcacgatcggcattccggagtttggcacgcgcttcgcttcgacaaatgtt	3500
SEQ_183	3470	GGAAGAGACAAGGCCAAAAACGTTTTCCGAACTCGTGCAAATTTCCGGCT	3519
G_kaustophilu	3501	 ggaagagacaaggccaaaacgttttccgaactcgtgcaaatttcggct	3550
SEQ_183	3520	TGTCGCACGGCACCGATGTGTGGCTCGGCAACGCGCAAGAGCTCATTCAA	3569
G_kaustophilu	3551	 tgtcgcacggcaccgatgtgtggctcggcaacgcgaagagctcattc aa	3600
SEQ_183	3570	AACGGCACGTGTACGTTATCGGAAGTCATCGGCTGCCGCGACGACATTAT	3619
G_kaustophilu	3601	 aacggcacgtgtacgttatcggaagtcacggtgcgcgcgacgacattat	3650
SEQ_183	3620	GGTCTATTTGATTTACCGCGGGCTCGAGCCGTCGCTCGCTTTTAAATCA	3669
G_kaustophilu	3651	 ggtctatTTGATTTACCGCGGGCTCGAGCCGTCGCTCGCTTTTAAATCA	3700

SEQ_183	3670	TGGAATCCGTGCGCAAAGGAAAAGGCTTAACGCCGGAGTTTGAAGCAGAA	3719
G_kaustophilu	3701		3750
SEQ_183	3720	ATGCGCAAACATGACGTGCCGGAGTGGTACATCGATTTCATGCAAAAAAAT	3769
G_kaustophilu	3751		3800
SEQ_183	3770	CAAGTACATGTTCCCGAAAGCGCACGCCGCCGCCTACGTGTTAATGGCGG	3819
G_kaustophilu	3801		3850
SEQ_183	3820	TGCGCATCGCCTACTTTAAGGTGCACCATCCGCTTTTGTATTACGCGTOG	3869
G_kaustophilu	3851		3900
SEQ_183	3870	TACTTTACGGTGCGGGCGGAGGACTTTGACCTTGACGCCATGATCAAAGG	3919
G_kaustophilu	3901		3950
SEQ_183	3920	ATCACC CGCCATTTCGCAAGCGGATTGAGGAAATCAACGCCCAAAGGCATTC	3969
G_kaustophilu	3951		4000
SEQ_183	3970	AGGCGACGGCGAAAGAAAAAGCTTGCTCACGGTTCTTGAGGTGGCCTTA	4019
G_kaustophilu	4001		4050
SEQ_183	4020	GAGATGTGCGAGCGCGGCTTTTCTTTAAAAATATCGATTGTGTACCGCTC	4069
G_kaustophilu	4051		4100
SEQ_183	4070	GCAGGCGACGGAATTCGTCATTGACGGCAATTCTCTCATTCGCGCGTTCA	4119
G_kaustophilu	4101		4150
SEQ_183	4120	ACGCCATTCCGGGGCTTGGGACGAACGTGGCGCAGGCGATCGTGCGCGCC	4169
G_kaustophilu	4151		4200
SEQ_183	4170	CGCGAGGAAGGCGAGTTTTTGTGCGAAGGAGGATTTGCAACAGCGCGGCAA	4219
G_kaustophilu	4201		4250
SEQ_183	4220	ATTGTGCAAAACGCTGCTCGAGTATCTAGAAAGCCGCGGCTGCCTTGACT	4269
G_kaustophilu	4251		4300
SEQ_183	4270	CGCTTCCAGACCATAACCAGCTGTCGCTGTTT	4301
G_kaustophilu	4301		4335